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In Line with Clinton's Agenda

NIST Program Aims to Boost High-Tech Civilian Industry

With the incoming Clinton Administration strongly committed to a major federal role in directly spurring high-tech civilian industry, interest is growing in a small, little-known government program that's been pecking at that task for the past three years, the Advanced Technology Program (ATP) of the National Institute of Standards and Technology (NIST). Created as part of the Congressionally led refashioning of NIST from the venerable National Bureau of Standards in 1988, ATP remains modestly financed—$68 million this year. Two past rounds of ATP competitions have produced a portfolio of only 38 projects, most funded at a couple of million a year, spread over two or three years. Nonetheless, the program has aroused considerable interest in industry, with applications, onerous to prepare, exceeding awards by over ten to one. The awardees are individual firms and joint ventures, sometimes in tandem with government and academic labs. Another round of ATP awards will be announced in about a month or so. SGR Editor Greenberg spoke on November 23 with ATP's original planner and first and only Director, George A. Uriano, a 30-year veteran of NIST and the old Bureau of Standards. Following is the text, transcribed and edited by SGR.

Q. No research on products here. You support "precompetitive" and "generic" research only. What do those terms mean?

Uriano. Precompetitive means it's at an early enough stage that it's high technical risk, not high business risk. Generic means that if you solve the technical problems, the results should be broadly applicable to a number of different products or services. We build in this social rate of return from the beginning, where there's likely to be a lot of spilloff, in economic terms. A company, even an IBM, cannot uniquely capture those benefits. It's not like when they're doing product design work, where they can, to a large extent, capture those benefits.

Q. Why not leave it to private venture capital?

Uriano. Venture capital has been less willing to take on risk. They've been shifting to companies that are well along in research and product development. We fund high risk up front.

Q. Some people regard ATP as a baby DARPA [Defense Advanced Research Agency, the Pentagon's renowned financier of hot technologies].

Uriano. DARPA is more than a billion dollars a year and

(Continued on Page 2)

Chairman's Holiday Message

Dingell Accuses NIH Head Of Hampering Gallo Probe

Rep. John Dingell, maestro of the accusatory missive, has dropped an especially savage one on Bernadine Healy, Director of the National Institutes of Health, just when transitional Washington is pondering whether Healy has a future in the incoming Clinton Administration.

In a nine-page, single-spaced letter dated November 24, Dingell accuses Healy and close associates of deliberately, perhaps illegally, thwarting his inquiries into NIH's dispute with the Pasteur Institute over patent rights to the blood test for the AIDS virus.

The Congressman is not without just grievances. A

(Continued on Page 6)

In Brief

Comment from a member of the Clinton transition team regarding scientists who insist that the President-elect should accord science and technology issues top priority: "It's like talking to mental patients. You have to look like you take them seriously."

Leaving quietly: Right up to election day, the White House Office of Science and Technology Policy was rigorously attentive to the press, promptly responding to inquiries and requests for interviews, even from SGR. Since the disaster, however, OSTP has gone off the line, with not even the press man there, let alone Director D. Allan Bromley, accepting or responding to SGR's calls.

Main message from the Commission on the Future of the National Science Foundation, which looked at NSF's potential for directly assisting industry: "Failures in the market place have not been the result of slow transfer of academic science to industry.... Redirecting the NSF's activities from research and education would have little or no effect on the US competitive position in the near term, but would severely restrict prospects for the long term." Commission Co-Chairman Robert Galvin, former Motorola CEO, made certain that the message got through to the National Science Board, to which the Commission reported on November 20. Galvin read the 11-page report aloud, word by word, for 35 minutes.

A near-record high of 1050 doctorates in mathematics were awarded by American universities during 1991-92, according to the Joint Policy Board for Mathematics, but the percentage of US-citizen recipients hit a record low, 42 percent of the total. As of September, 13 percent of the new PhDs in math were still seeking employment.

. . . Picking Up Where Basic Research Leaves Off

(Continued from Page 1)

has been in existence for about 35 years. We've got $68 million this year. Another big difference is that DARPA has a well-defined mission to support the development of technology that has an immediate or long-term benefit for meeting military requirements. We don't have well-defined requirements. DARPA has a lot of top-down planning and pushing into areas, like stealth technology, for example. We let companies say that "We think there's going to be a big market like optical communications. And in order to do optical communications, you need switches and multiplexes and optical fiber, etc., etc., and these are the most challenging problems in those areas and here's where we need help." It's more of a bottoms-up approach. We let industry take the lead, whereas DARPA says, "These are the areas that we feel we need to have satisfied." About half the projects we're currently funding, DARPA probably would have no interest in, because they're in areas that have been defined commercially and are not likely to have a big impact on defense.

***Q.** Even with the increasing overlap between military and civilian technologies?*

Uriano. Yeah. We have a project involving recycling of plastics, where the idea is to develop "compatibilizers," so that you can take a mixed stream of plastics and mix them together with additives and greatly cut down on the cost and greatly increase the efficiency. That's not a big problem for the military right now, but it's a big problem for the civilian economy. We're supporting a number of projects in the biotechnology area dealing with the expansion of stem cells [a component of bone marrow, which is used for therapeutic purposes], for example, with viral inactivation. That isn't something that DARPA is going to worry a lot about.

***Q.** When NIH spends $4 billion a year on biotechnology, why are you involved with it?*

Uriano. NIH focuses on basic research, primarily at universities. In fact, they supported some of the research that was the basis for our project. Once the early feasibility is established, we then look at what it takes to get that technology from the laboratory into the marketplace. In that particular case, it took some of the same people who were supported by NIH to form a company, and then the issue becomes not can you expand a stem cell, but can you expand it in a way that is effective for commercial purposes, for actual treatment of patients? And it's a scale-up issue in that case. A lot of the work has to deal with the development of bio-reactors, rather than the stem-cell expansion mechanism itself, which is what NIH had an interest in. We complement each other very well, and we rely heavily on NIH, FDA, and others to work with us in reviewing proposals and even in managing projects after we fund them.

***Q.** Do you support projects at startup companies?*

Uriano. Yes. There's a company, Nonvolatile Electronics, Inc., that was a startup—literally two people operating out of Minneapolis. The idea there is to develop a nonvolatile magnetic memory. It was just a couple of people when we funded them. It has since raised some venture capital. They're still a relatively small company. They have about 10 or 15 people working for them, mainly in research, and they are making good progress toward their ultimate goal, which is to establish the feasibility of this new kind of memory. They have worked closely with Honeywell, with the University of Minnesota, with NIST itself. NIST has made some substantial contributions to that project by virtue of a couple of the laboratories we have. That's typical of a number of projects that we have where the NIST laboratory is providing substantial help to the company or the joint venture. And I think that by that interaction, it will greatly enhance the possibility of success in these projects.

***Q.** Has there been any concern about supporting projects in some of the country's biggest corporations when many small firms have difficulty raising money?*

Uriano. Some people have raised issues along that line. But one could argue that a breakthrough at a company like IBM could have just as big an effect on the economy, maybe a bigger one, as funding 40 or 50 little projects at small companies. We look at it in terms of not the size of the company, but in terms of the technology that they're proposing. There was some concern initially that small companies wouldn't be able to compete head-on with big companies. That has not proven to be correct. The majority of our single-applicant awards go to small companies. Small companies even lead some of our joint ventures and participate in most of our joint ventures.

***Q.** But doesn't it raise concerns when, for all of the last fiscal year, you had less than $50 million to award? You've got applications that exceed a billion dollars. And you've got IBM, which spends $4 billion a year on research—*

Uriano. It's going down quickly.

***Q.**—and development. Why, with your meager resources, should you add a couple of million to IBM's research funds?*

Uriano. Because there are ideas at companies like IBM that involve projects that are so risky that IBM itself will simply not support them, or support them on a timely basis.

(Continued on Page 3)

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. . . Teaming Up Small Firms and Major Corporations

(Continued from Page 2)

They're willing to cost-share. If the IBM researchers bring in other companies, too, they're willing to pay some of the costs, but not all of the costs. And not on a timely basis. We have had some strong evidence that this is true. In fact, I know people at companies like IBM that have actually turned down projects that we have later funded. I know the people that turned them down, because it didn't get to the bottom line quickly enough. On the other hand, only time will say whether it will ever get to the bottom line, because we are funding high-risk projects.

Q. You're funding projects that involve IBM, AT&T, Bell Labs, Du Pont—all with R&D over a couple of billion dollars a year. Describe a project that you helped finance they didn't feel fit in with their business plans.

Uriano. You take a project like the AT&T one, which involves the development of X-ray optical components. AT&T does not manufacture anything like those components. In fact, nobody does right now. AT&T needs this kind of technology if it's ever going to produce high-density integrated circuits at .1 micrometer size or less. One of their laboratories had some ideas as to how you would make these components, but did not have all of the capabilities itself for making it. They recognized that there are three or four small companies in the United States that had some of that expertise, plus NIST and Brookhaven National Laboratory had some capabilities. They didn't have any mechanism for putting together a project like that in the company [AT&T]. The company management said, "We'll pay for some of this, but not all of it. You've got to get help from these companies and from the government and the government laboratories involved." And that was the basis for the project. If you look at the amount of NIST money that goes to AT&T, on that project, $2 million over three years, more than half of it eventually goes out again. And they're putting up $3.5 million. Effectively, that's a mini-joint venture. Similarly, the Du Pont one involves a small manufacturer of thin films. The project has to do with processing technology for making high-temperature superconductivity films in a way that you will not only make the films, but do annealing at the same time. It's a new approach to thin-film processing that has implications not only for superconducting materials, but for semiconducting materials. Du Pont would hope to take this processing technology someday and apply it to making thin films for electronic applications. However, that's not the main thrust of the project. The main thrust of the project is the processing itself and this new generation of processing equipment. So, they're working hand in hand with an equipment manufacturer to provide the processing tools.

Q. How does ATP compare to the Small Business Innovation Research program [in which almost all federal research agencies award 1.25 percent—eventually to be increased to 2.5 percent—of their extramural research funds to support R&D projects at small firms]?

Uriano. Some similarities, but we will fund companies, including small businesses, for much larger amounts of money over a longer period of time. We require companies to make a case not only on innovative research, but they also have to supply a much more thorough business plan than you do with an SBIR program. Another difference is that most of the SBIR programs are run by the mission agencies, who identify the technologies that they have an interest in, and the projects are an extension of their mission activities. If you look at the Defense SBIR program, you will find that DARPA, the Strategic Defense Initiative define areas of interest in the SBIR solicitation. You can only submit proposals in those areas. We're open to anything.

Another major difference is that we require cost-sharing. SBIR foots the whole bill, but it's a small bill. Phase I [of SBIR] has just been raised to $50,000 and Phase II to $750,000. And our proposals are much more thoroughly reviewed by business leaders. We form panels of private-sector people who come in and look at the commercial benefits of the proposals and the technology transfer plan. There are specific plans for how they're going to commercialize, and they have to have a commitment of funding lined up, either through venture capitalists, state programs, or whatever, to pay for that commercialization after federal funding ends. They have to have a pretty well thought through business plan.

Q. How do you handle patents?

Uriano. Congress gave us authority to give full title to all patents to the applicants. The federal government gets a royalty-free license for its own use. In the first two competitions [for ATP awards], we had a provision that allowed us to collect a portion of the royalties in proportion to the amount of the federal government's investment. That was removed, beginning with the third competition, because Congress felt it was a disincentive. But the important thing is the companies get full title and they decide amongst themselves as to how they're going to share title and how they will license to each other. The government only gets to use the technology for its own purposes, royalty free.

Q. But now the company keeps it all?

Uriano. The company keeps it all. The value added to the economy, in terms of employment, in terms of gross national product, will hopefully result in more taxes. Also, don't forget, we cut off our funding at the research stage. After our funding ends, there is substantial further investment that is required for specific product design and development, manufacturing investment, scaling up and that sort of thing. The federal government pays a very small fraction of the total freight of getting a product into the market.

Q. You're receiving about 300 full-fledged applications per year, and you've got money for only 18 or 20 of them. That's a pretty low rate by the standards of, let's say,

(Continued on Page 4)

. . . A Surge of Post-Election Interest in the Program

(Continued from Page 3)
NSF or NIH.

Uriano. The size of this program will have to be determined by the incoming Administration. But I think we could handle a lot bigger program, even a billion-dollar program, if policymakers feel that would be appropriate. Then we could argue about how quickly one would scale up. It's a chicken-and-egg game, because if we had more money, we'd probably be getting more applications, too. Certainly, we feel that a lot more money could be productively used. I don't think staffing up would be a real problem if we got more funding. DARPA grew very rapidly in the early days. As long as there is a commitment to scale up and an agreement between the Congress and the Administration that you're going to do it, you could plan fairly well. We're now running this program with a staff of about 15 plus some help from the NIST staff when we're reviewing applications. We have on hand a lot of resumes of very good people who are willing to come in. We rely very heavily on outside reviewers anyway. We don't need a large staff. I think you would look toward a DARPA model. DARPA manages well over a billion dollars with about 150 people. And they rely on detailees from elsewhere in DOD to supplement their staff. So, we're not talking about forming an agency of two, three, four thousand people. You're talking about a few hundred at most.

Q. *The Bush Administration was initially cool to this program.*

Uriano. I think they were viewing it as an experimental program to see whether we could invest in high-risk projects in a way that was fair and open, that involved a rigorous, competitive process, where even the companies involved would by and large agree that we were doing it the right way. I think we have established the fact that we can do that. Now it's an issue of how big should it get and how quickly. The program was authorized at the end of 1988, when the Reagan Administration only had a couple of months to go. The Bush Administration came in and it took a while to appoint the policy officials, to form the Technology Administration [parent agency of NIST in the Commerce Department]. The new Director of NIST did not get appointed at that time. That took six or eight months to straighten all of that out. Remember, the Bush Administration proposed a $20 million increase this year. It was Congress that actually had to struggle to come up with the money. Sixty-eight million was the Administration proposal. The Senate went along with it and initially, the House did not.

Q. *Have a lot of people been coming around, asking about this obscure government program, now that "industrial policy" is no longer a dirty term?*

Uriano. The phones have been ringing off the hook since the election. But also, we happen to have published a notice in the *Commerce Business Daily*, reminding people that another set of proposals is due in February. That might have had something to do with it, too. But, clearly, people are looking at a program like this in a different way, given that there's going to be a change in Administrations. I think it's going to take another three to six months to see what's going to happen here.

Q. *What are the measures of success for a program like this?*

Uriano. There are certain leading indicators of success. For example, we have been successful in getting a number of joint ventures and strategic alliances to form that would not have been formed if there had not been an ATP. An example is the National Storage Industry Consortium. It consists of about 30 organizations, mainly companies, with some universities and federal labs involved, that effectively covers the whole data-storage industry in the United States. They had received two grants from us, one in the first competition and one in the second, that deal with, in one case, optical technologies, and in the second, advanced magnetic storage. They would never have formed that consortium if it had not been for the ATP. Since that consortium was formed, they have not only received funding from the ATP, but they had a tentative commitment of funding from DARPA to work in an area that's complementary to our project.

Q. *How much did you give them?*

Uriano. The first year, we funded them with $5.4 million. They committed $9.2 million. The second year, we committed $5.5 million and they committed $6.2.

Q. *Has any of the work you've supported reached the market?*

Uriano. No, but one is a lot closer than some of the others. Our first project ended a couple of months ago. It was a joint venture between Hampshire Instruments, in New York, which is a manufacturer of semiconductor processing equipment, so-called steppers, and McDonnell Douglas Electronic Systems, in St. Louis, that was working on technology for pumping laser diodes. They successfully developed a technology. Now Hampshire Instruments has to incorporate it into an X-ray stepper system, test the X-ray stepper system in an actual fabrication environment, and then if all of that works out, they're there. That will give you the possibility of a very portable X-ray stepper for semiconductor processing. They're about a year away. They've reached a point where they at least can begin to do some tests in fabrication facilities during this coming year that they will pay for themselves. Our funding has ended with the establishment of the feasibility of the pumping technology.

Q. *What are rules about foreign participation in the projects you support?*

Uriano. Foreign companies are allowed to receive funding, providing they first meet the same criteria that US companies must meet, and that is that the work they carry out must be done in the United States. They must commit to subsequent manufacturing, at least some of their manufac-

(Continued on Page 5)

Knock, Knock, We're From the Clinton Transition

The Presidential transition has reached the point where chiefs have been appointed for so-called cluster groups that will visit the various federal departments and agencies and compile reports for the appointees who will head them in the new Administration. The process is expected to take four or five weeks, SGR is advised, and won't get started until members of the cluster groups have been selected, still in the works at the end of November.

Heading the science, space, and technology cluster is Sally K. Ride, physicist and former astronaut, who is Director of the California Space Institute at UC San Diego. Her group is responsible for NASA, the National Science Foundation, the Federal Communications Commission, and the National Commission on Libraries and Information Science (established in 1970 to advise the President and Congress).

Former Congressman Tom Downey of New York, defeated for reelection, is head of the health and human services cluster, which includes the National Institutes of Health and the other Public Health Service Agencies, the Department of Housing and Urban Development, the Department of Veterans Affairs, and the Consumer Products Safety Commission. Still to be determined is whether a separate sub-group will be formed for NIH.

Fresh from resigning the presidency of the World Resources Institute after 10 years in that post, Gus Speth will head the group for natural resources, environment, energy, and agriculture. Speth served as Chairman of the Council for Environmental Quality in the Carter Administration. (Speth will be succeeded at the Institute by Jonathan Lash, former Vermont Secretary of Natural Resources, who will take office in January.)

Education, arts, labor, and the humanities will be headed by Johnnetta Cole, President of Spelman College, Atlanta.

The examination of White House offices, including the Office of Science and Technology Policy, will be managed by a group operating out of Little Rock. So far, there's no word on a leading candidate for Presidential Science Adviser or any indication of Clinton's organizational preferences in the science-advice area. The main innovation revealed so far in the organization of the White House is the plan to establish an Economic Security Council as a domestic counterpart to the National Security Council. How, if at all, that affects OSTP is not known.

The task of the cluster groups is to examine the agencies, with particular emphasis on identifying problems that will need attention early in the new Administration. They'll prepare reports for the officials appointed to head the agencies, but are not part of the personnel selection process.

Meanwhile, rumors abound in Washington science circles about who's staying at and coming to NSF, NASA, NIH, FDA, and so on. But at this stage in the long transition process, decisions for those levels do not hold high priorities in Clinton headquarters.

Advanced Technology

(Continued from Page 4)

turing, in the United States. In addition, we must examine the country of origin of these companies and see that US-owned companies that are operating in those countries are given like circumstances and that those countries protect US-owned intellectual property. There's a reciprocity factor. Congress defined these requirements for us.

Q. Have you looked into what it costs a company to put together an application?

Uriano. Yes, we've asked them. Generally, it costs anywhere from $20,000 to $50,000, depending on how complicated the project is. The joint ventures could cost closer to $50,000. It's staff time. But a lot of the proposal preparation is done off line, people work after hours. I don't know whether that's a fair cost. But you worry about the issue. If you take 300 applications, and they average $20,000 in preparation costs—that's $6 million, right there. We're only providing $20 million or $30 million in funding. Is that cost effective? I think it is, because in getting companies to go through the proposal preparation, it brings together a lot of knowledge within the company and gets them thinking about issues that they might not have thought of otherwise. Even if they don't get funding, I would hope that something good would come of the project. I think NSF did a study a few years ago when they first started their Engineering Research Centers. They found that the applicants that were not successful went ahead and capitalized on those proposals, at least in terms of smaller-scale projects. I would hope some good came from the proposal writing.

Q. High-risk invites failure. Have any of your projects failed?

Uriano. Not yet, but there are some—I won't give you the names—that are clearly struggling in the first year and a half, where they have run into serious problems in the laboratory, and if they don't solve those problems, it may be that the project is not going to pay off; there will be nothing to commercialize, from their point of view. One of the good things about cost-sharing is that companies worry about that too, and they don't want to keep pouring money down a blind alley. We have some of our projects that actually have a "drop-dead" date. The companies have said, "We're willing to cost-share with you for a year or two years. However, if this milestone is not met, then we are out." We assume the government would be out, too, at that point. I would never fund projects that don't have cost-sharing. I think it provides a healthy safeguard.

. . . Dingell Attack Coincides With Transition Period

(Continued from Page 1)

sclerotic bureaucracy confronted by a nasty controversy involving its star researcher, Robert Gallo, NIH has indeed bumbled in response to Dingell's insistent demands for mountains of documents. In Dingell's view, incompetence alone is not the explanation for NIH's dawdling and twists and turns in satisfying his requests.

Stating that "my patience is near an end," Dingell declares in his letter to Healy that "there is a clear pattern of delay, obstructionism, and abuse in the NIH's actions in this matter that is intolerable, and strongly suggests that a cover-up is underway."

Healy and Dingell have been scrapping about NIH's management of misconduct, including the marathon Gallo case, almost from the start of her tenure there in April 1991. The latest letter, one of many from Dingell to Healy, would normally merit filing under "routine correspondence," except for the timing of its appearance and the status of its signatory.

Healy's fate in the Clinton regime is unknown at this point. But the future glows for John Dingell, prominent among the Congressional barons whom Clinton courts as essential to his Presidential success. The Energy and Commerce Committee that Dingell chairs spans an extremely wide jurisdiction on Capitol Hill. With law-writing authority over interstate commerce, energy policy, consumer affairs, biomedical research, and additional items, the Committee would be powerful under any Chairman.

But with the irascible and politically shrewd Dingell at its helm and also in the chair of its Subcommittee on Oversight and Investigations, the Energy and Commerce Committee is a formidable bastion in Congressional affairs. When the President-elect and his wife made their first post-election visit to Washington last month, Congressman and Mrs. Dingell were, not surprisingly, among the guests who joined them at dinner.

Dingell's letter to Healy presents a long inventory of difficulties that his Subcommittee staff has encountered in obtaining documents from NIH related to the patent controversy, which Dingell's Subcommittee is investigating as part of its long-running inquiry into how science polices its use of public funds.

In several instances, Dingell wrote, NIH denied the existence of documents but then turned around and supplied them when his staff insisted that they were in NIH files. Thus, referring to the delivery of a batch of documents following several requests from the Subcommittee, Dingell writes: "I was pleased to receive these documents, although again, I note that they clearly fall within the ambit of the Subcommittee's original request, and thus, should have been provided many months ago. But incredibly, the documents still do not include certain ... documents known to exist and sought by this Subcommittee. The NIH apparently is still withholding documents."

Healy and Perot: Part II

Did NIH Director Bernadine Healy meet with Ross Perot last summer, and if so, did they discuss her running for Vice President on his ticket? So it was reported on October 20 by *USA Today*, which quoted the head of Perot's Vice Presidential search as saying Healy was the only VP prospect who met with Perot to discuss the subject and "Though she turned Perot down, he was really impressed with her." In the second Presidential debate, Perot mentioned Healy as a possible running mate.

Asked by SGR last month about this improbable political duo, one of Healy's press assistants said no such meeting had taken place [SGR, November 15]. SGR, however, heard that the two had indeed met, and repeated its inquiry to NIH. After several repeats of the inquiry went unaswered, a revised answer was provided on November 24 by Healy's Senior Adviser for Media Relations, Johanna Schneider.

Healy had met with Perot "last summer" in Washington at Perot's request, she said, adding that the discussion "was 99.9 percent about health care and biomedical research." Perot, she said, wanted to know "why the US is preeminent in biomedical research in comparison with other countries." The meeting was described as "private." When and where did it take place, and was the Vice Presidency discussed? Schneider said she would find out and call back. We're still waiting.

The patent controversy on which Dingell's letter focuses overlaps with the original case involving Robert Gallo, whose claimed roles in the identification of the AIDS virus and the development of the HIV blood test have led to a long controversy with the Pasteur Institute. Last March, Healy endorsed an investigative report that she said "absolved" Gallo of scientific misconduct, though it accused him of "disregard for accepted standards of professional and scientific ethics" [SGR, May 1: "NIH Report Assails Gallo's Behavior But Clears Him"].

While the Gallo report was under review in the Department of Health and Human Services, questions about its thoroughness and conclusions were raised in a critique prepared by a former NIH investigator of the case, Suzanne Hadley. Hadley was removed last year from investigative duties at NIH at the direction of Healy, who expressed concern about security of investigative records and about the cooperative relationship Hadley had developed with the "whistle-blower" in the so-called Baltimore case. At Dingell's request, Hadley has been on detail from NIH for the last several months as a member of his Subcommittee staff.

Healy has many supporters and admirers in Congress. But if Dingell chooses to get mean, he can probably outweigh them all.—DSG

More IN PRINT: UNESCO, World Bank, SBIR, Etc.

(Continued from Page 8)

costs; revenues from patient care by clinical faculty have expanded from 6 percent of the schools' total revenues 30 years ago to 45 percent in 1990-91 and "currently constitute the largest single source of funding for medical schools." Tuition and fees "have remained a relatively stable component of medical school revenues at about 4 percent." Federal research funds, $4 billion, accounted for 19 percent of total revenues. The report notes that applicants for first-year admissions peaked in 1974 at 42,624, declined to 26,721 in 1988, and rebounded last year to 37,500.

Order from: Association of American Medical Colleges, Division of Institutional Planning and Development, 2450 N St. NW, Washington, DC 20037-1126; tel. 202/828-0521

INISTE (15 pp., no charge), a periodic "information bulletin" from the International Network for Information in Science and Technology Education, produced by the Section of Science and Technology Education of the United Nations Education, Scientific, and Cultural Organization. Brief items describe meetings and programs on S&T education in many countries. Contacts for additional information are listed. The publication is available in English, French, Spanish, Russian, and Arabic.

Order from: The Iniste Secretariat, ED/EDV/STE, UNESCO, 7, place de Fontenoy, 75352 Paris 07 SP, France.

Research Activities (16 pp., no charge), monthly newsletter published by the Agency for Health Care Policy and Research, in the US Department of Health and Human Services. Included are summaries of publications from studies sponsored by the Agency, with instructions for obtaining copies, schedules of meetings, recent grant awards, etc.

Order from: AHCPR, Publications Clearinghouse, PO Box 8547, Silver Spring, Md. 20907; tel. 1-800/358-9295.

From the World Bank Education and Employment Division, Population and Human Resources Department, several recent publications (no charge) on the role of science and technology in economic development, traditionally one of the lesser interests at the Bank, a major source of capital for developing countries.

Improving the Quality of Research in Developing Country Universities (PHREE/92/52; 49 pp.), by Erik W. Thulstrup, a Danish chemist and spectroscopist who is Senior Science and Technology Specialist on the Bank staff and one of the few scientists in the institution. The report advises developing countries to focus on the output of their research organizations rather than on financial input. "Identify unproductive researchers," Thulstrup recommends, adding a bit of advice that developed nations might also heed: "In many countries, a large part of the total research funding is tied up in facilities, services, and, in particular, salaries to researchers, who produce very few or no results, and who therefore set poor examples for students and have a negative impact on attitudes [in the] researcher community. Give such unproductive researchers the intellectual or financial support they need in order to become more productive, or, if this does not work, encourage them to take up other duties."

Industry-University Collaboration in Developed and Developing Countries (PHREE/92/64; 57 pp.), by Linda E. Parker, consultant to the Bank, reviews the development of research parks and similar clusters in developed and developing countries, including the US, UK, Asia, Africa, and Latin America.

Secondary School Science in Developing Countries: Status and Issues (PHREE/92/53; 173 pp.), by Sylvia A. Ware, consultant to the Bank, a wideranging review of science education in developing countries, including discussions of curricula, budgets, classroom materials, teacher preparation, etc.

Order from: World Bank, Education and Employment Division, Population and Human Resources Department, Room S 6214, 1818 H St. NW, Washington, DC 20433; attn. Ms. Cynthia Cristobal; tel. 202/473-3640.

Small Business Innovation Research (no charge) from the Department of Energy, "Abstracts of Phase I Awards, 1992" (DOE/ER-0560; 119 pp.), contains summaries of 198 DOE awards in Fiscal 1992 under the startup phase of the SBIR program, for which the maximum award is $50,000. A separate publication, "Program Solicitation" (DOE/ER-0559; 93 pp.), describes DOE's areas of interest for the next round of Phase I awards—deadline March 8.

Order from: USDOE, SBIR Program Manager, ER-16, GTN, Washington, DC 20585; tel. 301/903-3054.

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IN PRINT: Violence, Transplants, Minority Degrees

The publications listed are obtainable as indicated—not from SGR.

Understanding and Preventing Violence (464 pp., $49.95 in US, Canada, Mexico, plus $4 for shipping first copy, 50 cents each for more), from the National Academy of Sciences Panel on Understanding and Control of Violent Behavior, a detailed, illuminating examination of the sparsely researched and politically sensitive subject of violence in America, by far the most homicidal and mayhem-prone of industrial societies, the panel observes. The report reviews crime statistics, research on policing and crime-prevention techniques, incarceration rates, behavioral and biomedical research on crime, and data on alcohol, drugs, and guns. The panel toted up a mere $20 million in federal spending on violence research, a miserly sum, it said, in comparison to spending on cancer, AIDS, and other threats to life. The panel that produced the report was chaired by Albert J. Reiss, Professor of Sociology, Yale University. Three volumes of background materials for the report are in preparation—publication date not scheduled. Support for the study was provided by the National Institute of Justice (in the Justice Department), the National Science Foundation, and the Centers for Disease Control.

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1-800/624-6242; in Washington, DC, 334-3313.

UNOS Update (no charge), monthly magazine of the United Network for Organ Sharing, contractor for the National Organ Procurement and Transplantation Network, established by the federal government to facilitate transplants of body organs. The October issue (47 pp.) includes tables comparing transplant rates of various organs in the US and European countries, reports of meetings, publications, appointments, job openings, etc.

Order from: UNOS, 1100 Boulders Parkway, Suite 500, PO Box 13770, Richmond, Va. 23225-8770; tel. 804/330-8500.

High-Technology Competitiveness: Trends in US and Foreign Performance (GAO/NSIAD-92-236; 74 pp., no charge), from the General Accounting Office (GAO), requested by Chairman Lloyd Bentsen of the Senate Finance Committee, a review of US performance in 11 major high-tech industrial fields vis-a-vis other industrialized nations, but mainly Japan, Germany, and France. A lot of the data on this subject are spotty and of dubious reliability, the GAO cautions, but indications are, it says, that many American industries lost ground in the 1980s, with pharmaceuticals a major exception.

A table on non-defense R&D expenditures shows the US far ahead of its leading competitors, with recent expenditures nearly double those of Japan. The US was also far ahead in output of scientific literature. But the relationship of industrial competitiveness to R&D spending and scientific prowess is unclear, the report states. Among the findings: America fared worst in relatively low-tech industries, prominent among them consumer electronics, which has largely shifted production to low-cost countries. In 1990, the report states, the US imported $12.4 billion worth of consumer electronics goods—six times the level of exports in this category.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

Science and Engineering Degrees by Race/Ethnicity of Recipients: 1977-90 (106 pp., no charge), from NSF's Division of Science Resources Studies, charts and detailed tables covering degrees awarded in the physical and social sciences, engineering, medicine and other health fields. The race/ethnicity categories are black, non-Hispanic; American Indian or Alaskan Native; Asian or Pacific Islander; Hispanic; white, non-Hispanic. Susan T. Hill, an analyst in the Division, was project officer for the report.

Order from: NSF, Division of Science Resources Studies, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4300.

Social Policy Report, quarterly newsletter of the 4000-member Society for Research in Child Development ($10 per year for non-members; single issue $3.50). The summer 1992 issue (27 pp.) is devoted to a single article, "Testing in American Schools: Issues for Research and Policy," by Patricia Morison, an analyst in the Congressional Office of Technology Assessment, who observes, "One of the most striking issues in current debate [about standardized achievement testing] is information about the effects of tests and testing on the children themselves. A core assumption ... is the notion that tests with important consequences will serve to motivate children to work harder and learn more; increase the consequences for poor performance, the thinking goes, and children will work harder. Yet there is very little direct evidence about the effects of such presumed incentives on actual test performance."

Order from: SRCD Executive Office, University of Michigan, 300 North Ingalls, 10th floor, Ann Arbor, Michigan 48109-0406; tel. 313/763-3717.

American Medical Education: Institutions, Programs, Issues (36 pp., no charge), from the Association of American Medical Colleges, Washington-based organization of the nation's 126 medical schools, a collection of basic financial and administrative facts about medical education, for which total annual revenues, from all sources, have risen from $436 million in 1960 to $21 billion (excluding construction and student loans) at present. Federal money, as a fraction of the total, peaked at 55 percent in the mid-1960s and has since declined to 22 percent, mainly in grants and contracts for teaching, research, and service, plus indirect

(Continued on Page 7)